QUALITY SCHOOL EDUCATION FOR ALL: CREATING VIRTUAL SCHOOL FOR EDUCATIONAL TRANSFORMATION

Takwale M G, I-CONSENT, mgtakwale@yahoo.com
Desai C K, MKCL, ckdesai@mkcl.org
Kale Y G, MKCL, ygkale@mkcl.org
Panchpor U, MKCL, udayp@mkcl.org
MKCL Finishing Schools,MSIHMCT, Bldg, 412C Shivajinagar, Pune 411016. INDIA

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INTRODUCTION:

Education is the key for development and prosperity of any society. Education is a way to acquire knowledge; and knowledge is the foundation for entering successfully into the new global society. However, if education is not imparted with built-in equality and justice,   education will never be able to create homogeneous society.   In fact, in today's global opportunities and competition, quality and excellence are the key determining factors for development and prosperity. The school education is imparted at present in Maharashtra State, India by Municipal / District Board schools, aided public schools, private unaided schools and international schools. The present system of education is creating hierarchy and stratification in quality of education provided to the students. The disparities in education are increasing. The impact of this is quite obvious; education will not lead to a society based on equality and justice. This is particularly seen when we compare the quality of education imparted to urban and rural students.

The present models of education do not show any way out to bridge this gap. A bold and new initiative is essential. Quality School Education For All (QS-EFA) is one such initiative developed by I-CONCENT and MKCL evolved after discussions and deliberations with experts in the field of education.

I-CONSENT is a group of educationists and institutions, both from public as well private sectors, who have come together to develop new system of education for equality and justice. MKCL is providing its e-platform and network as well as the essential support to this program. The Commonwealth of Learning, Vancouver, Canada has supported this endeavor and provided continuous guidance. With the sustained efforts during the last few years, the group has succeeded in evolving a framework for offering Quality School Education for all. It is our considered opinion that only Information Communication Technology mediated processes and methods can help us in creating a model of education that leads to Quality Education For All. Further, the model and design has to be based on future scenario so as to have any chance of success.

VIRTUAL SCHOOL FOR QUALITY TEACHING AND LEARNING:

Purpose of the program is to demonstrate and ensure quality teaching and laboratory experimentation for improving the existing school education. It further offers ways of identifying talent in each one and cultivating it to the higher levels of achievement (Basic-*Sambodh,* Proficient- *Pravinya and* Talented-*Pradnya*). As a pilot, the program is offered through Taluka Lead Centers of MKCL to the selective students of Maharashtra State including urban as well as rural students. Each TLC is developed with virtual Classroom facility which is used by the students, teachers and parents. About 15 TLCs have

established Science Laboratories and Computer facilities which can be used by the students for their training. These centers deliver quality education through e-teaching and e-learning. Local teachers are identified and trained for tutoring small groups of students in real and virtual situations. They monitor a group of students and help them to explore science through laboratory experimentation and develop skills and competencies through self learning process. The program is open for students of 8th to 10th standards and includes science and mathematics as major thrust areas. Teachers and students study at the TLC in face-to-face as well as in distributed classroom situations. They are supported through web based network and digital library system. The students interact with expert teachers through e-mail, virtual class sessions and mentors. They can evaluate their achievements by online test series offered by TLCs. Three specific activities undertaken under the Virtual School program are described below (www.mkcl.org).

(1) Prayog Pariwar Kendra (PPK):

Science and Technology is one of the important tools of the economic and social transformation. Though India has developed good infrastructure, still our contribution to basic science and to the expansion of human knowledge is marginal and to the technology negligible. The main reasons for this lie in great lacunae in science education imparted to our school and college students. Prayog Pariwar Kendra (PPK-Center for Experimenting Groups) can be looked upon as one of the solutions.

The experiments in the school laboratories are mostly 'verification of law' type. PPK aims to create laboratory facilities for learning science through exploration and open ended kind of experimentation. Such experiments help concept building, make the students analyze and infer.

In PPK, students will enjoy doing science through synergetic, constructive and beautiful combination of exploration, innovation and working by own hands. Further, the process of joyful learning will be practiced in PPK.

Structure of Prayog Pariwar Kendra:

PPK will be equipped with mainly physics, chemistry, and life science and mathematics laboratories. In addition computer and electronics laboratory is provided as subsidiary facility. The students of PPK will perform experiments in curriculum and experiments beyond their curriculum based on concept building, project and application of laws of science. In addition, there will be (i) summer workshops, (ii) creativity and hobby workshops, (iii) science promotion program for parents and college students, and (iv) Teacher Training Programs.

The Functioning of Prayog Pariwar Kendra:

1. PPK facilitates to learn Science through experimentation and exploration,
2. The students work in PPK laboratory two hours before or two hours after their school hours. The laboratory timings will be adjusted to suit the school timings.
3. The strength of the batch will be maximum 10 students per teacher, and will depend on physical facilities of particular PPK. Personal attention, dialogue with the student and participation of a teacher in the experimentation will be possible due to the small number of students in the batch.
4. Students will be enrolled for minimum one year and they will regularly work in PPK lab once a week. A student will be expected to perform twenty experiments from their curriculum and twenty experiments beyond their curriculum in a year. Every student will learn at least five to ten demonstration experiments. The students will also interact with experts and scientists through Virtual Class.

To begin with, we decided to concentrate on **Pune district** and developed model laboratories at Taluka / Tehsil places. The Model required space of about 1000 sq. ft for the laboratory. Each laboratory was equipped with set of equipments worth Rs 70,000/-. All experiments given in curriculum could be done with a set of apparatus provided and many more can be done with additional equipments of about Rs

30000/-. MKCL provided 15 sets of equipments to the TLCs for imparting PPK program successfully. The concept of PPK was explained to teachers and parents through a series of workshops.

Each PPK appointed a group of four teachers of science subjects. Two centers viz Indapur and Daund started PPK program successfully and registered about 1500 students. The program was implemented by these centers for two years.

MKCL provided a team of subject experts. The team developed activities and assignments for each experiment which helped to build the concept of that experiment. Further a project was suggested based on the concept which students learned through the experiment. These activities and assignments were practiced by Indapur and Daund TLCs successfully whereas most of the other TLCs failed to implement the program because of lack of committed teachers and management.

The major difficulties faced while implementing the program at the block level were,

1. We do not have culture of learning by doing. Lot of things is planned and most of the things remain on paper. The present generations of teachers are the outcome of the existing system. We need to mould the teachers first then only they will be able to pass on the new culture of activity-based learning to students.
2. The staff should be knowledgeable and should have aptitude of learning. Presently the teachers are using age old method of teaching even in the laboratory. This is predominantly observed in the schools situated in rural areas. Therefore it is difficult to deploy this program to the students. The remuneration paid to the teachers is much less than the government and aided schools. It is very difficult to sustain this programme financially because this is not a regular teaching as in schools but an effort to give quality education through innovative method.
3. Paying capacity of rural student is very low. Secondly, the parents are reluctant to pay to institutions for such an open education. Ironically, the parents do not mind to pay for private tuitions. There are many reasons behind it. In view of the above difficulties, the expert team decided to create self learning material for laboratory experiments. Each experiment is rewritten in detail in the template of 'Learning Content Management System' (LCMS) format. Learning material consists of experimental procedure, four activities, sub-experiments and project. Further actual experimental procedure, done by an expert, is videotaped and put on DVD so that students can see the DVD and do the experiment. We have prepared DVD's based on the 21 experiments selected from syllabus of high schools. These DVD's along with learning material were given to the students of Wardha and Khed centers. Students did these experiments using DVD's and gave their feedback in a prescribed form. Almost 60 to 65% of the students do not require any help of local teacher for performing these experiments. These DVD's and learning material is now made available to 412 schools of Rayat Shikshan Sanstha (Maharashtra State, India) through ERA software.(www.mkcl.org/digitalschool) The response is excellent; therefore this method will be implemented in other TLC's.

Observations:

The usefulness of the method of 'learning by doing' is well known in science. Further when students learn by 'exploratory way', they have proved themselves internationally competent (Pune has won 12 science and astronomy Olympiad medals). Even rural students have shown their competency in national talent search examinations (Wardha students have won gold and silver medals in last two successive years in NET examinations). However, we observe that,

1. New experiments in Education must be supported by the society then only it can be judiciously given to all sections of society.
2. A strong replicable business model needs to be evolved. MKCL team is working on such model.

(2) Nurturing Excellence and Talent (NET):

We have accepted globalization even in the field of education. Foreign Universities are entering in Educational System of India. To compete with them, we must take our Education in School and Colleges to international level. International Olympiad Examinations are ultimate examinations where the

knowledge and intelligence of the students are tested. Previously Olympiad examinations were conducted only at senior level. Since 2004, International Junior Science Olympiad Examination has been started for students of age below 15 years. India is participating in IJSO since 2008. Indian Students have brought laurels to the country in science Olympiads. The students who brought laurels at senior as well as junior Olympiad were mostly from urban areas, main reason for this is the information of Junior Olympiad examination does not reach even to district level students. The students of rural areas are not at all aware of these examinations. I-CONCENT and MKCL have taken initiative to create awareness of Olympiad examination in rural and urban students, and nurture the hidden talent in them.

The school curriculum is prepared by the Central and State Government Boards and Councils, to educate all school going students on large scale. However this does not provide proper scope for talented students. Much importance is given to percentage of marks a student gets, but not to fundamental knowledge. There is no opportunity for the innovative thinking for the students. Question papers are based on direct information given in the text books, which does not test understanding, intelligence and application of knowledge acquired by the student. Therefore I-CONCENT and MKCL launched a innovative program viz Nurturing Excellence and Talent (NET) for students of age below 15 years.

Structure and Implementation of NET Program:

The NET program is implemented by using MKCL's e-platform extended over entire State of Maharashtra through their TLCs and 3500 MHCIT Centers. Every school and every student in the state can be reached through these centers.

Initially MKCL decided to offer this program linked with International Junior Science Olympiad examination. In future it will be extended to other subjects like Mathematics, Social Sciences, and Languages etc. This program does not use concept of failure or success but evaluates student's level of achievement and guides him/her to achieve higher and higher level of knowledge in the subject. This program intends to accommodate all those who desire to participate in searching and nurturing talent by assuming that every child has some kind talent in him/her.

The main features of NET program are
1) The students of age below 15 years can participate in this program.
2) The students are evaluated at three different levels of achievements,
3) Nurturing program is given to the students through virtual class between the two examinations.
4) Students can interact with expert teacher during Virtual Class or through e-mail afterwards. These lectures are also made available at the TLC's so that students can access them any time.
5) A Team of Expert Teachers prepare Question Banks for level I, II, and III examinations. These Question Banks are made available to the students to prepare for Olympiad examination
6) Based on the performance of the students, 35 top students are given Medals and Merit Certificates (Gold-5, Silver-7, Bronz-7, Merit Certificates-16) and recognized as "Maharashtra Olympiad Scholars". Each Scholar is given a set of outstanding books worth Rs 2000/-. The parents and mentors of these scholars are also felicitated.
7) A special Summer Workshop is organized for Maharashtra Olympiad Scholars in Institute/College of repute.

It is extremely necessary to convince the teachers, parents and school authorities that talent must be recognized and nurtured. This can be done by organizing meetings with students, teachers, school authorities, and parents.

Aim of the NET examination is to elevate competency level of students. There is no pre condition of marks to take part in examination. Any student from VII – Xth tandard can appear for these examinations and can prove his/her capacity at three stages. After every examination student will get inspiration to acquire knowledge rather than to run after the mark-score.

Third level Examination is exactly on the lines of IJSO examination pattern.

There are 10 multiple choice questions in each science subject and 4 subjective questions in Physics, Chemistry, Biology (Botany + Zoology).

Two workshops of one week duration are organized every year. It includes lectures on science subjects by experienced teachers and scientists; and open ended advanced experimental training. During the workshop, students perform experiments on their own. From this, they improve their understanding of the subject; increase their laboratory skills and analytical thinking to draw conclusions.

(3) Open Education Resources (OER) for School Education:

While implementing PPK and NET programme we recognized the need to develop learning material which essentially is different from the textbooks used in classroom learning. VSLH needs creating learning material which is suitable for self learning with a provision to increase level of knowledge step by step. Hence I-CONSENT and MKCL undertook a programme to create Open Educational Resource.

The program is based on the world wide movement of open resources such as Wikipedia, open courses of MIT (USA), open school resources etc. The program of OER for school education is supported by the Rajiv Gandhi Science and Technology Commission of Maharashtra State for creating content for learning, teaching, training, and application of knowledge. The nodal agency of the program is Homi Bhabha Center for Science Education (HBCSE) with I-CONCENT and MKCL as the partners in the OER development.

The program aims at creating a meta-database with reusable learning objects for school education on the platform of MKCL, and will be made accessible to all through the network. The OER is useful for raising quality of teaching-learning and for nurturing talent. Teachers will also be trained in developing open educational resources of quality and in using OER for tutoring a student or their group. A learner can increase level of knowledge step by step starting from his present level of knowledge by using OER.
A team of experts is preparing OER for science subjects starting from school level.

SUSTAINABILITY AND BUSINESS MODEL FOR VSLH:

The new education should concentrate on making the youth self-reliant in finding their career paths in working life in the emerging knowledge economy. A market focus is therefore essential for applicable skills, and also on innovation, creativity and entrepreneurship essential for acquiring market competitiveness.

The school education can never become self-supporting and needs support from society and State in the unequal society with many deprived and disadvantaged. The functionaries in VSLH are many and work for various aspects of educational development and deployment activities. Livelihood of many is dependent on the returns they get for the products and services they provide. The programs and activities of VSLH are, therefore, built on the basis of sound financial policy or good business model so as to become self-sustainable. Sustainability is either based on the fees charged for the services and facilities provided by the local entrepreneurs. The development and product costs are expected to be met through the support from the society and the State. Support to the weaker and disadvantaged students and their schools is expected to be the local community and State through various means. Progress of VSLH will depend on the social support and people's philanthropy.

Open Education Resource based education gives an opportunity to local experts, voluntary workers and enlightened citizens to create amenities in schools or community learning centers and to provide quality services to all the local students. Social entrepreneurship and activism are essential to create a movement of quality school education for all.

REFERENCE

Website of MKCL gives information about Community Development and e-Empowerment Programs:

1. Prayog Pariwar Kendra: www.mkcl.org/ppk
2. Nurturing Excellence and Talent-School Olympiad Program : www.mkcl.org/net
3. Open Education Resources: www.mkcl.org/oer

The other programs related but not included in the paper are:
4. Digital School –Network for Rayat Shikshan Sanstha's Schools: www.mkcl.org/digitalschool
5. Hobby Home: www.mkcl.org/hobbyhome
6. Nirman - Creation: http://nirman.mkcl.org